Database Systems Homework #2 (Due date: Nov 07, 2022)

Goal: Construct a relational database for a railroad company such as Korail.

0. Notice
   - Answers in Step 1 can be written in English or Korean, and answers in Step 2 should include ER diagrams. The file name of the report should be Homework2_StudentID.pdf, where StudentID is a student identifier given to a GIST student.
   - For Steps 3 – 5, execute SQL queries using SQLite in Jupyter notebook. You need to take screenshots of SQL queries and results and put them into the report. In addition, save SQL queries and results as Homework2_StudentID.ipynb, where StudentID is a student identifier given to a GIST student.
   - Submit Homework2_StudentID.pdf and Homework2_StudentID.ipynb to **the LMS system** by **11:55 pm** on November 07, 2022.
   - Late submission policy: For every day after due date, 20% of gained marks are deducted.
   - Do not copy other students' answers.

1. (10 pts) specify functional requirements for a railroad company.
   - At least three different types of entities (train, train_driver, passengers, train_schedules, tickets, etc) should be included.
   - At least five functional requirements for the database of the railroad company should be included.
   - Examples
     - Show all trains of the company.
     - Show a list of reserved tickets for a given passenger.
     - Show available seats of the train that travels from a given departure location to a given arrival location on a given day and time.
     - Show IDs of trains, drivers of the trains, and train operating schedules on a given day.

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2. (20 pts) Design Entity-Relationship diagrams.

   - Database should contain at least three entities.

   - An entity should have at least one relationship with other entities.

3. (30 pts) Transform Entity-Relationship diagrams in Step 2 into relational schemas. Then, design SQL statements for creating Tables corresponding to the relational schemas.

4. (10 pts) Insert synthetic data into Tables.

5. (30 pts) Convert the functional requirements in Step 1 into SQL query statements. Then, execute queries using data constructed in Step 4, and show the results.

   - All Tables in Step 3 should be queried at least once.

   - Results should not be empty or null.

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